Electronic Supplementary Material (ESI) for Soft Matter.

Electronic Supplementary Information (ESI)

From a silane monomer to anisotropic buckled silica nanospheres: a polymer-mediated, solvent-free and one-pot synthesis

Chih-Hui Lo[1] and Teh-Min Hu[1,2*]

1. School of Pharmacy, National Defense Medical Center, Taipei, Taiwan, ROC
2. Faculty of Pharmacy, School of Pharmaceutical Sciences, National Yang-Ming University, Taipei, Taiwan, ROC

*Corresponding author: Teh-Min Hu, Ph.D. tehmin@ym.edu.tw, Faculty of Pharmacy, School of Pharmaceutical Sciences, National Yang-Ming University, Taipei, Taiwan.

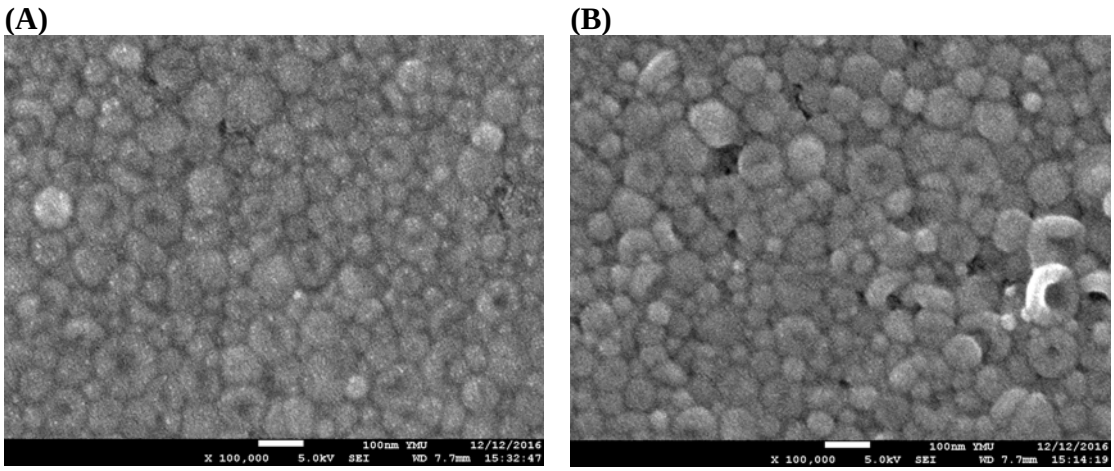

Figure S1. SEM images for SiNPs formed at (A) 120 min and (B) 180 min (Supplementary to Figure 5). The reaction condition was: MPTMS, 60 mM; PVA (80% hydrolyzed), 0.5%; HCl, 0.5 M; and $NaNO_2$, 60 mM; 25 °C; total volume: 3 mL

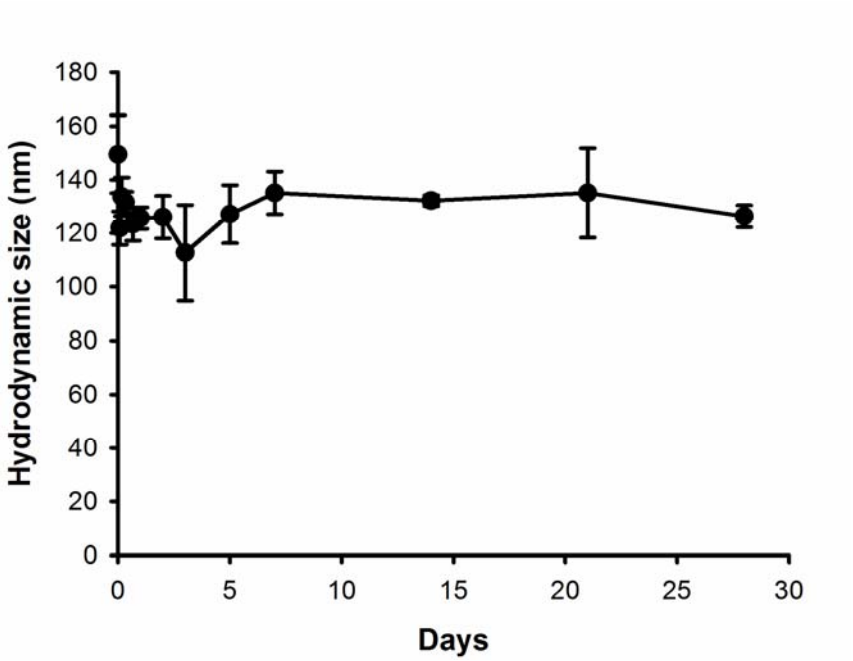

Figure S2. Physical stability of SiNPs in an aqueous dispersion over a period of 28 days.

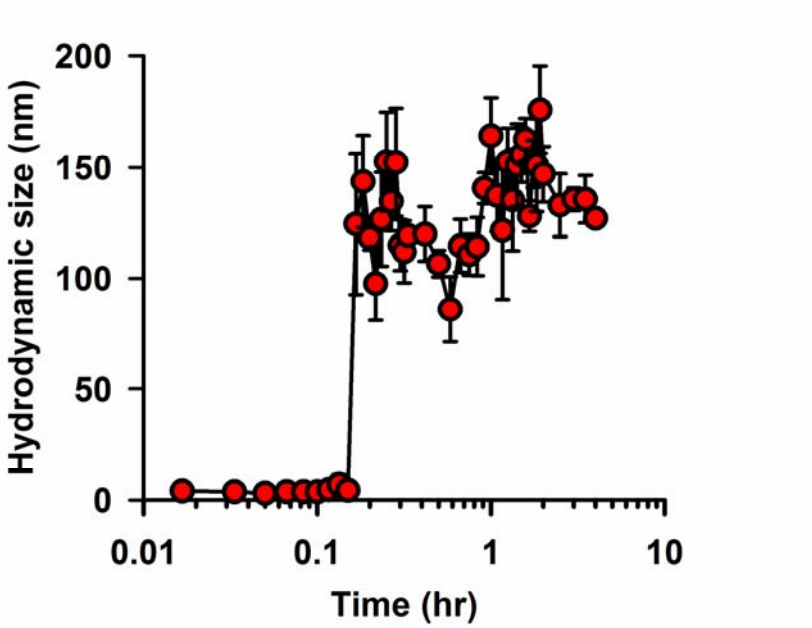

Figure S3. Monitoring the change of hydrodynamic sizes in the reaction over time.

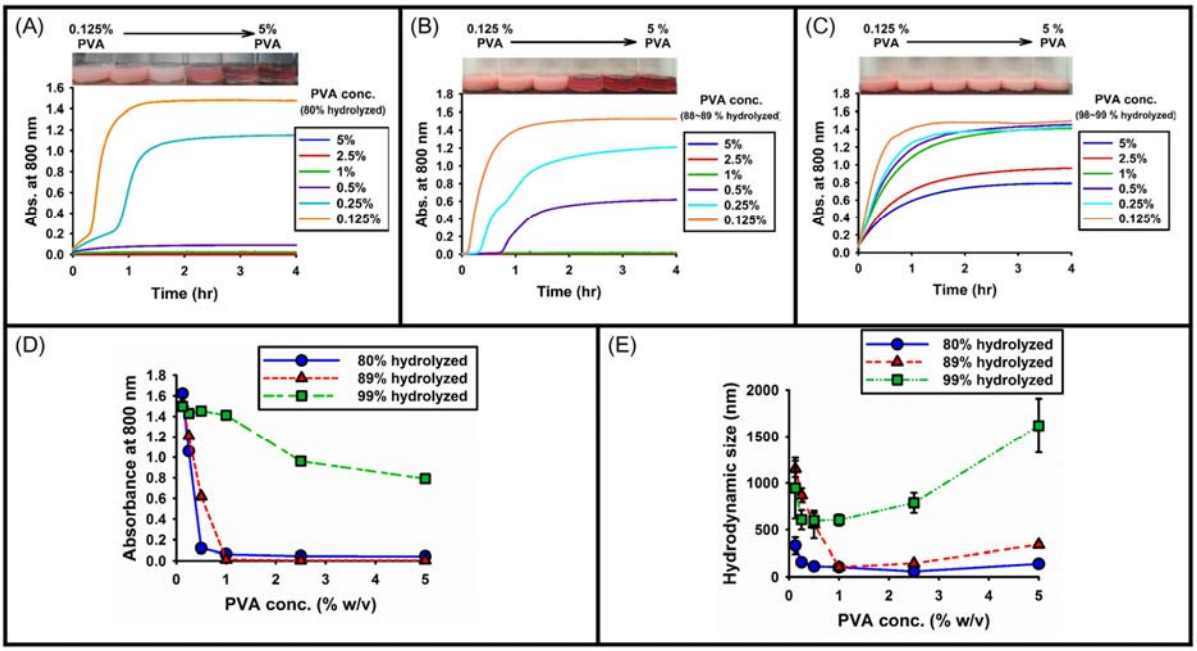

Figure S4. Comparison of the effect of different PVAs (with different degree of hydrolysis) on particle formation and stabilization. (A)-(C) The dynamics of particle formation (turbidity changes) for (A) 80% hydrolyzed PVA, (B) 89% hydrolyzed PVA, and (C) 99% hydrolyzed PVA. The corresponding images show the appearance of the reaction mixtures at the end of reaction (4 h). (D) Turbidity (optical density at 800 nm) as a function of PVA concentration. (E) Hydrodynamic sizes as a function of PVA concentration. Note that the same data for 80% hydrolyzed PVA in Figure 1 of the main text (Figure 1 B & D) was included for comparison.

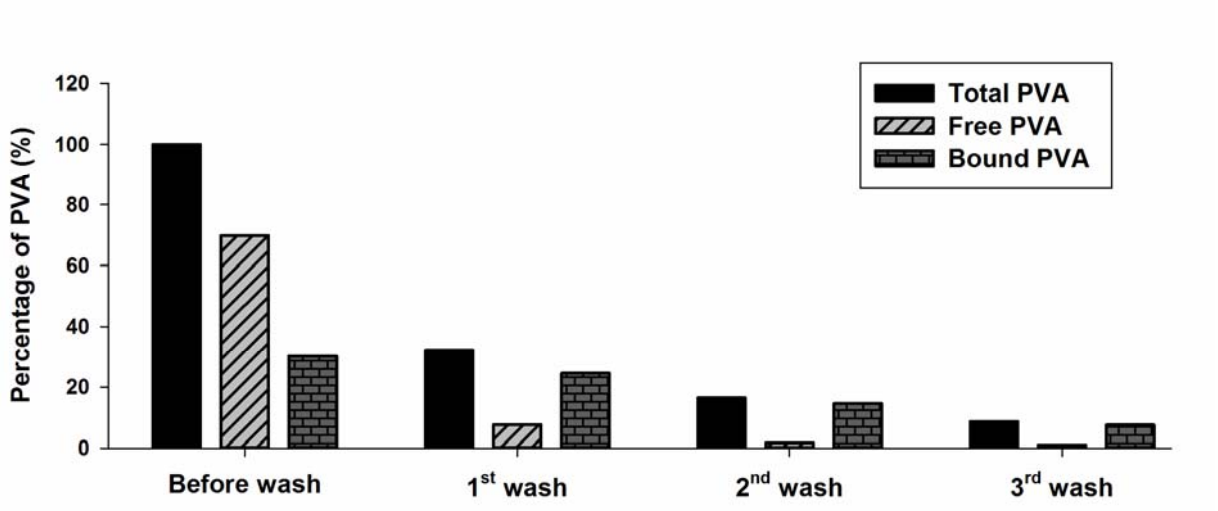

Figure S5. The residual amount of PVA in SiNPs at different stages of preparation. At each stage (right after synthesis and before wash, 1st wash, 2nd wash, and 3rd wash), total PVA was determined before centrifugation. Free PVA was determined from the supernatant after each centrifugation. Bound PVA was estimated by subtracting total from free.

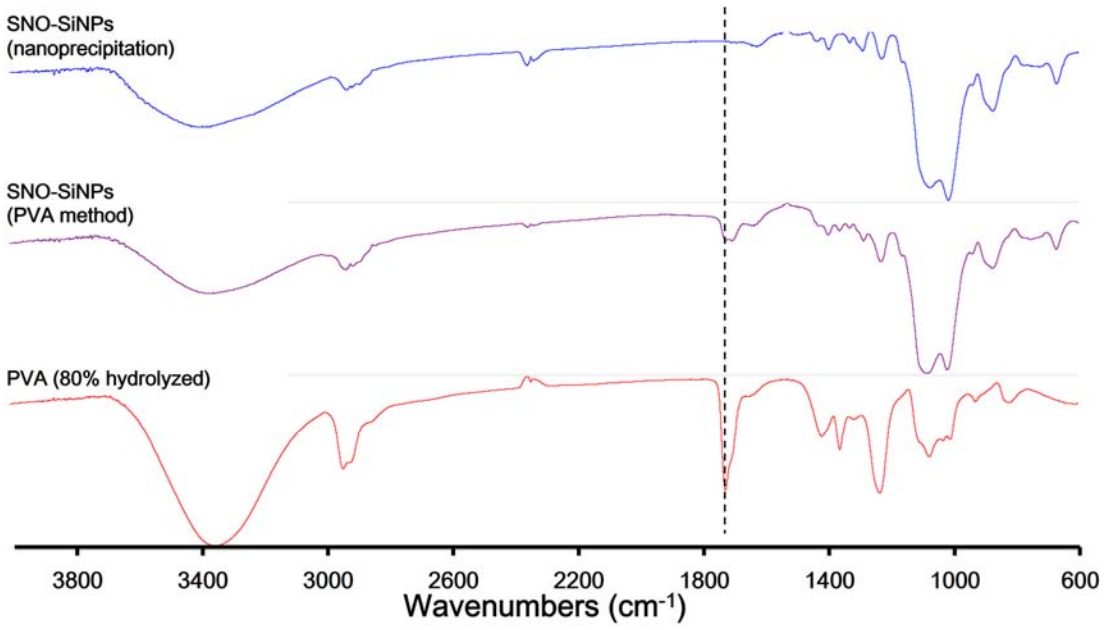

Figure S6. FTIR spectra for SiNPs prepared by the nanoprecipitation method (without PVA, for comparison) and by the current PVA method. Note that SiNPs made by the PVA method contain the characteristic peak of PVA at 1720 cm^{-1} (C=O stretching).